

4th Year

Common Courses

- 1 55000037 Projects
- 2 55000038 Materials Technology
- 3 55000039 English for Professional and Academic
Communication

55000037 - PROJECTS

CREDITS:	4.5 ECTS
DEPARTMENT:	Organization Engineering, Business Administration and Statistics(MAS)
COURSE COORDINATOR:	Rocío Rodríguez Rivero
TYPE:	Common
YEAR AND SEMESTER:	4th Year / Fall

LIST OF TOPICS

MODULE 1. Projects theory

- 1) Introduction to the project. Types of projects
- 2) General theory of the project
- 3) Previous studies. Viability of the project.
- 4) Environmental impact study

MODULE 2. Engineering projects

- 5) Design in engineering
- 6) The technology of the project: process engineering
- 7) Basic Engineering
- 8) Detail Engineering
- 9) Procurements
- 10) Construction, mounting and commissioning
- 11) Safety and health
- 12) Alternatives to the project
- 13) Legislation

MODULE 3. The preparation and processing of the project

- 14) Types of documentation and its structure
- 15) Legal implication of the documentation and actions
- 16) Responsibility of the designer and construction management

MODULE 4. Basic elements of project management

- 17) Notions of project planning
- 18) The time of project management
- 19) Budgeting of works and services

RECOMMENDED COURSES OR KNOWLEDGE

RECOMMENDED PREVIOUS COURSES:

COURSE: none

TOPIC: none

RECOMMENDED PREVIOUS KNOWLEDGE OR ABILITIES:

Industrial processes and project documentation

SPECIFIC OUTCOMES FOR THE COURSE

At the end of the course, the student will be able to (or will have ability for):

- Drafting and development of projects. Understand and structure the variety of categories of typical projects of Industrial Engineering. To structure the specific knowledge needed for promoting and facilitating problem resolution in the field of engineering projects, problems that students are likely to find in their near professional life.
- Management of engineering projects. Develop time scheduling, cost and budgeting activities.
- Management of project certification standards.

STUDENT OUTCOMES

- ABET_1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- ABET_4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- ABET_5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

BIBLIOGRAPHY

TEXT BOOKS

"Ingeniería de proyectos" by González Marcos, A., Alba Elías, F. & Ordieres Meré, J.

"Teoría general del proyecto" & "Dirección de proyectos" by De Cos, M. Ed. Síntesis

OTHER MATERIALS

Notes and presentations in Moodle and Microsoft Project Management Software (UPM license).

55000038 - MATERIALS TECHNOLOGY

CREDITS:	4.5 ECTS
DEPARTMENT:	Applied Physics and Materials Engineering (P&M)
COURSE COORDINATOR:	J. Oñoro
TYPE:	Common
YEAR AND SEMESTER:	4 th Year / Fall

LIST OF TOPICS

MODULE 1. Materials processing

- 1) Casting: metallic and non-metallic materials
- 2) Sintering: metallic and ceramic materials
- 3) Forming and forging of metallic materials

MODULE 2. Joining techniques

- 4) Welding processes. Steel weldability
- 5) Adhesive joints
- 6) Mechanical joints
- 7) Hybrid joints

MODULE 3. Performance in service

- 8) Corrosion
- 9) Fracture
- 10) Fatigue
- 11) Creep
- 12) Wear

MODULE 4. Defectology, inspection and testing.

- 13) Origin of defects in materials
- 14) Inspection
- 15) Non destructive testing
- 16) Mechanical testing
- 17) Other materials characterization tests

RECOMMENDED COURSES OR KNOWLEDGE

RECOMMENDED PREVIOUS COURSES:

COURSE:

TOPIC:

RECOMMENDED PREVIOUS KNOWLEDGE OR ABILITIES:

- Properties/Structure (crystal systems, alloy phase diagrams and microstructure) relationships in materials.
- Mechanical properties of materials: Elastic and plastic behavior fundamentals.

SPECIFIC OUTCOMES FOR THE COURSE

At the end of the course, the student will be able to (or will have ability for):

- Understand the influence of service conditions on the materials properties, and failure analysis.
- Understand the meaning of an inspection and quality control, and to analyze their results.
- Understand the relationship between manufacturing processes, achievable designs and material properties.

STUDENT OUT COMES

- ABET_1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics.

BIBLIOGRAPHY

TEXT BOOKS

Tecnología Mecánica y Metrotecnia
Jose M^a Lasheras. Ed. Donostiarra

Soldadura. Aplicaciones y práctica
H. Horwitz. Ed. Alfaomega

AWS Welding Handbook.
Ed.AWS

Adhesives and sealants. Engineered Materials Handbook.
Ed. ASM

Introducción a la Pulvimetalurgia
P. Molera. Ed. Bellaterra

Corrosión y protección metálicas. Vol I y II
Sebastián Feliú y Carmen Andrade. Ed. CSIC

Fallos en servicio de los materiales metálicos.
José María Pintado Fe. Ed. INTA. CSIC

Elementary Engineering Fracture Mechanics.
David Broek. Ed. Martinus Nijhoff Publishers

ASM Handbook Vol.8. Mechanical Testing & Evaluation
Ed. ASM

ASM Handbook Vol.12. Fractography
Ed. ASM

ASM Handbook Vol.13. Corrosion
Ed. ASM

ASMSHandbookVol.19.FatigueandFracture
Ed. ASM

Métodos de Ensayos No Destructivos. Tomos I y II.
Ed. INTA. CSIC

Fundamentos de Manufactura Moderna
M.B. Groover. Ed. Brentice

OTHER MATERIALS

AulaWeb, Moodle, Lab Welding, Lab NDT

55000039 - ENGLISH FOR PROFESSIONAL AND ACADEMIC COMMUNICATION

CREDITS:	6 ECTS
DEPARTMENT:	Linguistics Applied to Science and Technology (LIN)
COURSE COORDINATOR:	I. Arinas Pellón
TYPE:	Common
YEAR AND SEMESTER:	4th Year / Spring

LIST OF TOPICS

MODULE 1. INTRODUCTION TO COMMUNICATION IN ENGINEERING

1.1. Electronic tools for communication

- 1.1.1. Spell-checking tools and citation tools
- 1.1.2. Grammar checking tools & style checking tools
- 1.1.3. Plagiarism detection tools
- 1.1.4. Bilingual & monolingual dictionaries
- 1.1.5. Glossaries, terminological databases & lexical search tools
- 1.1.6. Encyclopaedias
- 1.1.7. Corpora & corpus-based tools
- 1.1.8. Reference management
- 1.1.9. Knowledge mapping

1.2. Basic concepts for communication

- 1.2.1. Audience, purpose and structure
- 1.2.2. Rational argumentation, emotional argumentation, credibility and relevance
- 1.2.3. Schemata, framing, web of meaning
- 1.2.4. Types of text: description, instruction, persuasion, narration

1.3. Style and organisation of information

- 1.3.1. Clarity and language
- 1.3.2. Continuity and texts
- 1.3.3. Conciseness and texts
- 1.3.4. Coherence and texts
- 1.3.5. Cadence and texts
- 1.3.6. Structuring information with language - density vs. specificity

1.4. Genre: reading comprehension - journal articles

- 1.4.1. Genre: the concept and examples
- 1.4.2. Reading comprehension, vocabulary & language use

1.5. Presentations: introduction and general characteristics

- 1.5.1. Audiences
- 1.5.2. Purposes
- 1.5.3. Structures

1.6. Unit Vocabulary

1.7. References

1.8. Communication in popular culture

MODULE 2. COMMUNICATION IN ENGINEERING PROJECTS

- 2.1. Stakeholder theory and audience communication needs**
 - 2.1.1. Introduction of led light bulbs in Haiti
 - 2.1.2. Deepwater horizon oil spill accident
 - 2.1.3. Communication events and value elements in purchase decisions
- 2.2. Basic communication skills - the language of persuasion**
- 2.3. Reading comprehension: information gathering for projects**
 - 2.3.1. Professional magazines and description structures
 - 2.3.2. Patents
 - 2.3.3. E-mail offers - scam offers
- 2.4. Writing project: technical report - off-grid whisky distillery in Porin, Scotland**
 - 2.4.1. Project briefing
 - 2.4.2. Power generation and storage
 - 2.4.3. Distillation and associated processes
 - 2.4.4. Other required machinery
 - 2.4.5. Buildings
 - 2.4.6. Logistics, marketing and management
- 2.5. Technical drawing types: meaning and uses**
- 2.6. Graphs and tables: uses and limitations**
- 2.7. Structure of technical reports**
 - 2.7.1. Persuasion drivers in professional communication
 - 2.7.2. Assessing credibility in project proposals
- 2.8. Unit Vocabulary**
- 2.9. References**
- 2.10. Engineering in Popular Culture**

MODULE 3. Understanding Lectures and Journal Articles

- 3.1. Lecture structure, listening strategies and reading assignments**
 - 3.1.2. Lecture organisation and understanding
 - 3.1.1. Listening strategies
 - 3.1.3. Reading assignments: Bachelor's level text books
- 3.2. Definitions**
 - 3.2.1. Structure of definitions
 - 3.2.2. Grammar of definitions
 - 3.2.3. Reviewing technical definitions
- 3.3. Plagiarism**
- 3.4. Unit Vocabulary**
- 3.5. References**
- 3.6. Academic contexts in popular culture**

MODULE 4. COMMUNICATION AND JOB SEEKING SKILLS

- 4.1. Introduction to communication for job seeking**
- 4.2. E-mails**
- 4.3. Cover Letters**
- 4.4. Motivation Letters – Purpose Statements**
 - 4.4.1. Cultural Peculiarities
 - 4.4.2. Internal information structure
- 4.5. Curriculum Vitae - Résumé**
- 4.6. Job Interviews**
 - 4.6.1. Before interviewing: research strategies and persuasion
 - 4.6.2. Types of interviews in engineering jobs: communication requirements

4.6.3. Interview follow-up

4.7. Unit Vocabulary

4.8. References

4.9. Jobs in popular culture

RECOMMENDED COURSES OR KNOWLEDGE

- The registration rules at the UPM state that a B2 level of English as described in the Common European Framework of Reference (CEFR) is required. This requirement may be fulfilled by presenting a language knowledge issued by an official certification entity or by passing an internal UPM-certification test.

RECOMMENDED PREVIOUS COURSES:

COURSE: not applicable

TOPIC: not applicable

RECOMMENDED PREVIOUS KNOWLEDGE OR ABILITIES

- Basic knowledge of communication in Spanish

SPECIFIC OUTCOMES FOR THE COURSE

The students are expected to follow engineering lectures in English, carry out standard university student tasks (write reports, present teamwork, read scientific literature, and follow lectures). They must also be able to write project reports, resumes, cover letters, motivation letters, and e-mails in professional settings. They must show their capacity to present project outcomes and progress as well as access complex technical communication either by reading journals, patents and professional magazines or patents. Finally, they must be able to follow conversations in job interviews, training seminars and third party presentations by both native and non-native speakers of English.

STUDENT OUTCOMES

ABET 3 – an ability to communicate effectively with a range of audiences.

ABET 4 – an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

ABET 5 – an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

ABET 7 – an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

BIBLIOGRAPHY

TEXT BOOKS

Aristotle (2012). *The Art of Rhetoric*. London: Harper Press. [4th Century B.C.]

Aronson, Elliot; Wilson, Timothy D.; & Akert, Robin M. (2010). *Social Psychology*. Boston: Prentice Hall.

Atkins, Peter (2010). *The Laws of Thermodynamics: a very Short Introduction*. Oxford: Oxford University Press.

Bain, Malcom; Gallego, Manuel; Martínez Ribas, Manuel; & Rius, Judit (2010). *Legal Aspects of the Information Society*. Barcelona: Universitat Oberta de Catalunya.

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- Wypych, George (2017). *Atlas of Material Damage* (Second Edition). Toronto: ChemTech Publishing.

OTHER MATERIALS

Exercises on the teaching platform of the ETSII, AulaWeb

Wiki for the course: <https://www.english4communication.pbworks.com>

Section 1 of module 1 provides exhaustive references to electronic tools to solve language and communication problems.